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3M INNOVATIVE PROPERTIES COMPANY			BALLINGER, MICHAEL ROBERT	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/771,641	<b>Applicant(s)</b> RABY ET AL.
	<b>Examiner</b> Michael R. Ballinger	<b>Art Unit</b> 3776

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 07 February 2011.  
 2a) This action is FINAL.      2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-36 and 38-88 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-36, 38-88 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftperson's Patent Drawing Review (PTO-941)  
 3) Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_

4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date \_\_\_\_\_

5) Notice of Informal Patent Application  
 6) Other: \_\_\_\_\_

### **DETAILED ACTION**

1. In acknowledgment of the amendments filed 7 February 2011, claims 1-88 are currently pending.

#### **Claim Rejections - 35 USC § 103**

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-11, 13-14, 17-36 and 38-50, 52-84, 87-88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chapoulaud et al. (U.S. 2002/0028417) in view of Fujita et al. (U.S. 5,712,965).

4. Per claims 1-4, 39-43, 75-77, 80-84 Chapoulaud teaches a method, system, and non-transitory computer readable medium for displaying, via a user interface of a computing device, a three-dimensional (3D) digital representation of a tooth of a dental arch within a 3D environment and displaying a 3D representation of an orthodontic appliance in the 3D environment (see e.g., figures 5E and 5F). Additionally, Chapoulaud teaches allowing the practitioner to move the orthodontic appliance relative to the 3D representation of the tooth with in the 3D environment (paragraph 0091). The Examiner notes, Chapoulaud fails to explicitly teach displaying via the user interface a two-dimensional planar guide with the 3D environment as a visual aid to the practitioner in the placement of the appliance or as the user moves the orthodontic appliance rendering the planar guide at a location that is based on a position of the appliance. However, figures 16, 17A to 17C, and 18A to 18C of Fujita teach the use of planar

guides (i.e., each face of the circumscribed rectangular parallelepiped) to aid in the positioning of solid 3D object within a 3D environment where the planar guides are rendered at a location that is based on a position of the 3D object within the 3D environment (see column 5, lines 63 to column 6, lines 59 and column 17, lines 3 to column 18, line 33). Additionally, Fujita teaches generating the planar guide within the 3D environment relative to a coordinate system associated with the 3D object (column 14, lines 53-57).

5. Therefore, it would have been obvious to one having ordinary skill in the art to modify the method, system, and medium of Chapoulaud by using the method of manipulating 3D objects as taught by Fujita to manipulate the orthodontic appliance of Chapoulaud in order to improve operability as taught by Fujita (column 6, lines 27-36).

6. Per claims 5-6, 44-45, and 78 the Examiner notes, Chapoulaud fails to explicitly teach a mesial planar guide and a distal planar guide as claimed. However, the incorporation of the circumscribed parallelepiped of Fujita in to the environment of Chapoulaud would result in both mesial planar guides and distal planar guides. Specifically, it is clear from Fujita that the faces of the circumscribed parallelepiped represent the extents of the object in three orthogonal axes. As such, a parallelepiped circumscribed around a dental appliance would provide mesial and distal planar guides as claimed. Similarly with respect to claims 7-11, and 46-50, the six faces of the parallelepiped of Fujita which circumscribe a dental appliance of Chapoulaud would include an occlusal planar guides or midlateral (i.e., the top face of the parallelepiped), a midfrontal plane (i.e., the front face of the parallelepiped), a midsagittal planar guide (i.e., the left or right face of the parallelepiped) and a gingival planar guide (i.e., the bottom face of the parallelepiped). With respect to claim 13 and 51, the planar guides of Fujita include at least two

lines (see figure 17A to 17C and 18A to 18C). Per claims 87 and 88, figure 28B of Fujita teaches displaying a planar guide that does not contact the object and displaying a planar guide at a distance from the object.

7. With respect to claim 14 and 15, the Examiner notes, Chapoulaud teaches displaying teeth in different colors (paragraph 0084) but fails to teach displaying the planar guides as different colors. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Chapoulaud and Fujita to include displaying the planar guides as different colors based on input from a user, in order to more easily differentiate the different planar guides

8. With respect to claim 18 and 19, Chapoulaud teaches storing data describing attributes for the types of appliances that may be selected (i.e., bracket design data, paragraph 0062, 0094), but fails to explicitly teach that the planar guides are displayed based on the stored data. However, the planar guides of Fujita are arranged so as to circumscribe the 3D object. As such, the displaying of the planar guides would be based off of at least the dimension of the orthodontic appliance and thus meets the limitations as claimed.

9. Per claims 21-24 and 53-60, the Examiner notes neither Chapoulaud nor Fujita explicitly teach storing in a database planar guide data within the computing device, storing different types of planar guides for different types of appliances or teeth. However, it is clear from the disclosure of Fujita information regarding the planar guides is readily accessible upon the selection of a specific 3D object within the environment (i.e., column 17, lines 12-22, teaches selectively displaying planar guides based upon which solid is select by the user). Additionally, the use of a database as a storage means and a network are well known in the art. As such, the

Examiner submits storing information with respect to the planar guides would be an inherent step in the method of Fujita since the planar guides are displayed immediately upon the identification of the solid. Furthermore, one having ordinary skill in the art would recognize that each planar guides for each of the orthodontic appliances of Chapoulaud to be manipulated by the method of Fujita would have attributes stored relating to the planar guides for that particular appliance. Similarly, each planar guide for each appliance for each tooth would have different attributes (e.g., their positions in the global coordinate system). Also per claim 25-28 and 61-64, the planar guides of Fujita would have stored attributes specifying shear angle (i.e., angle of rotation, column 18, lines 12-14) and scales (i.e., magnifications, column 19, lines 12-16) and automatically scaling the planar guides (i.e., column 19, lines 26-31) and automatically shearing (i.e., rotating) the planar guides (column 18, lines 27-33).

10. Per claims 31-32 and 67-68, the Examiner notes, Chapoulaud and Fujita fail to explicitly teach storing statistical normal distances for the dimensions of the teeth. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to store and utilize statistically normal teeth sizes in order to allow the device to minimize the amount of information that must be manual entered into the system. The Examiner notes, Chapoulaud discloses manufacturing orthodontic appliances. As such, an actual physical dimension would be necessary to ensure the manufactured appliances are of adequate size to perform their intended task.

11. Per claims 33-36 and 69-43, the Examiner notes, Chapoulaud fails to teach displaying visual markers relative to the planar guides at discrete intervals. However, Fujita teaches displaying visual markers on a rectilinear grid of semi-transparent lines or tick marks (column

11, lines 23-32, and figures 6A to 6K). Per claim 38 and 74, Chapoulaud teaches the appliance is a bracket.

12. **Claims 12, 15, 16, 20-21 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chapoulaud et al. (U.S. 2002/0028417) in view of Fujita et al. (U.S. 5,712,965) and further in view of Seidl (U.S. 5,583,977).**

13. Per claims 12, 15, 16 and 21, the Examiner notes, Chapoulaud and Fujita fail to explicitly teach adjusting the transparency of the planar guides based on input from a user. However, Seidl teaches planar guides (i.e., faces of bounding box, 398) with levels of transparency ranging from invisible (i.e., wireframe), opaque, and transparent (column 7, lines 27-44). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Chapoulaud and Fujita to include selectively adjusting the transparency of the planar guides as taught by Seidl, in order to allow the user to view or not view the appliance inside the planar guides during a positioning step. Additionally, with respect to claims 20 and 56, the Examiner notes, that levels of transparency disclosed by Seidl could be construed as different types of planar guides (i.e., wireframe is one type and opaque is another).

14. **Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chapoulaud et al. (U.S. 2002/0028417) in view of Fujita et al. (U.S. 5,712,965) and further in view of Weichmann et al. (U.S. 2003/0152884).**

15. The Examiner notes, Chapoulaud and Fujita fail to explicitly teach the planar guides are automatically scaled to size the planar guide based on a dimension of the tooth. However, Weichmann teaches orthodontic brackets with pads that are sized based on the dimensions of the teeth (paragraphs 0086-0087). Therefore, it would have been obvious to one having ordinary

skill in the art at the time the invention was made to modify the method disclosed by Chapoulaud and Fujita to include sizing the orthodontic appliance according to a dimension of the tooth as taught by Weichmann in order allow for reliable positioning of the appliance on the tooth. The Examiner notes, if the appliance is sized based on the dimensions of the tooth then the size of the circumscribing parallelepiped of Fujita will be based on the size of the tooth.

**16. Claims 29-30, 65-66, and 79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chapoulaud et al. (U.S. 2002/0028417) in view of Fujita et al. (U.S. 5,712,965) and further in view of Kopelman et al. (U.S. 2003/014509).**

17. Per claims 29-30 and 65-67 and 79, Chapoulaud and Fujita disclose a method and system that shows the limitations as described above; but fails to teach data of rules for orthodontic appliance. Kopelman et al. teach a method and system comprising data 110 of rules for applying the orthodontic appliance. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method and system to comprise data of rules in order to obtain a desired outcome of positioning and orientation in view of Kopelman et al.

**18. Claims 85 and 86 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chapoulaud et al. (U.S. 2002/0028417) in view of Fujita et al. (U.S. 5,712,965) and further in view of Taub et al. (U.S. 6,334,772).**

19. The Examiner notes, Chapoulaud and Fujita fail to explicitly teach the occlusal guide penetrates an occlusal surface of the teeth or that the distal guide penetrates a distal edge of the teeth. However, Taub teaches a method for positioning orthodontic appliances on teeth including guides (i.e., reference lines, 60 and 62) which penetrate an occlusal surface and a distal edge of a representation of the tooth (see figures 7A and 7B). Therefore, it would have been

obvious to modify the method as taught by Chapoulaud and Fujita to include displaying an occlusal guide which penetrates an occlusal surface of the tooth and a distal guide which penetrates a distal edge of the tooth, in order to position the appliance based on the size and shape of the tooth as taught by Taub (column 7, lines 42-57).

#### **Allowable Subject Matter**

20. Claim 37 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### **Response to Arguments**

21. Applicant's arguments filed 7 February 2011 have been fully considered but they are not persuasive.

22. Beginning on page 21 of the remarks Applicant has argued Chapoulaud and Fujita do not render obvious the invention as claimed because "in Fujita, a user provides input directly moving the rectangular parallelepiped, and an object is subsequently moved based on the edit operation preformed on the rectangular parallelepiped." Applicant further argues "in Fujita, the location of the object disclosed by Fujita (which the Office Action appeared to propose replacing with an orthodontic appliance) is based on movement of the rectangular parallelepiped (a plurality of 'planar guides' according to the Office Action)." The Examiner respectfully disagrees and notes, that in Fujita the position of the parallelepiped, as the object is being moved, is based on the final position of the object as intended by the user. Thus, the planar guides (i.e., the faces of the parallelepiped) of Fujita are rendered at a location that is based on **a position** of the orthodontic appliance (i.e., the object circumscribed by the parallel piped), where the position is the final

position of the object. Applicant argues “In contrast to the requirements of Applicant’s claim 1, in Fujita, the rectangular parallelepiped is moved independently of the object it circumscribes, such that the rectangular parallelepiped would not provide a visual aid to a practitioner in placement of an orthodontic appliance relative to the tooth of the dental arch within a 3D environment.” The Examiner disagrees. The Examiner notes, the parallelepiped is not moved independently as asserted by Applicant because the final position of the parallelepiped after it is moved dictates the new position of the object. Also, the method of Fujita would provide a visual aid to a practitioner since the parallelepiped during the moving stage of Fujita would offer an indication of final position of the appliance prior to actually rendering the appliance at the final position. On pages 23-26 Applicant has presented arguments with respect to claims 12, 15, 16, 20, 26-32, 51, 56, 67, and 68. The Examiner believes the above rejection has clarified the Examiner’s position with respect to these claims. Applicant’s arguments with respect to claims 85 and 86 are moot in view of the new grounds of rejection.

### **Conclusion**

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael R. Ballinger whose telephone number is (571)270-5567. The examiner can normally be reached on Monday thru Friday 9:00 AM to 6:00 PM.
24. If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Todd Manahan can be reached on (571)272-4713. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

25. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael R Ballinger/  
Examiner, Art Unit 3776

/TODD E. MANAHAN/

Supervisory Patent Examiner, Art Unit 3776